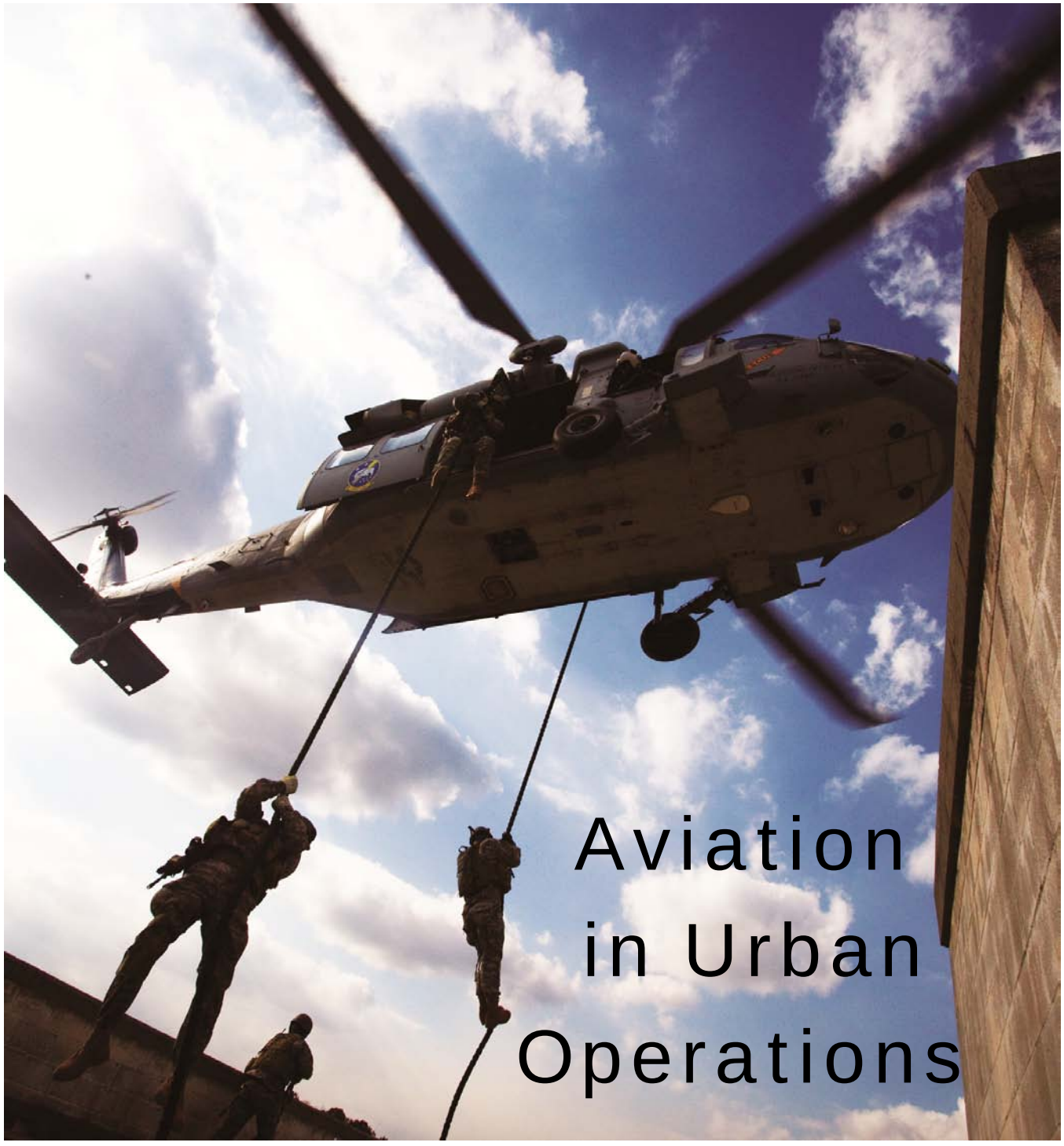
AIR LAND SEA BULLETIN




Issue No. 2011-2 **Air Land Sea Application (ALSA) Center** *May 2011*



Aviation in Urban Operations

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
MAY 2011		**00-00-2011 to 00-00-2011**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Air Land Sea Bulletin. Issue No. 2011-2, May 2011	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Air Land Sea Application (ALSA) Center,ATTN: ALSB,114 Andrews Street,Langley AFB,VA,23665-2785**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

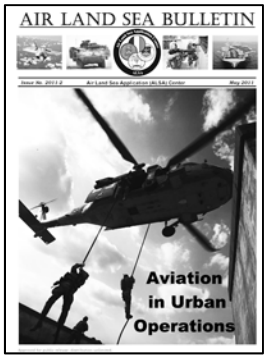
12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**32**	



Staff

Director

Col David B. Hume, USAF

Deputy Director

COL Bruce Sones, USA

Editor

Mrs. Bea Waggener, Civilian, USAF

Layout

Ms. Laura Caswell, Civilian, USN

Publications Officer

CDR (S) Cindy Dieterly, USN

Purpose: ALSA Center publishes the *ALSB* three times a year. ALSA is a multi-Service DOD field agency sponsored by the US Army Training and Doctrine Command (TRADOC), Marine Corps Combat Development Command (MCCDC), Navy Warfare Development Command (NWDC), and Curtis E. LeMay Center for Doctrine Development and Education (LeMay Center). This periodical is governed by Army Regulation 25-30, Chapter 10. The ALSB is a vehicle to "spread the word" on recent developments in warfighting concepts, issues, and Service interoperability. The intent is to provide a cross-Service flow of information among readers around the globe. **Disclaimer: Since the ALSB is an open forum, the articles, letters, and opinions expressed or implied herein should not be construed to be the official position of TRADOC, MCCDC, NWDC, Lemay Center, or ALSA Center.**

Submissions: We solicit articles and reader's comments. Contributions of 1,500 words or less are ideal. Submit contributions, double-spaced in MS Word. Include name, title, complete unit address, telephone numbers, and e-mail address. Graphics can appear in an article, but you must also provide a **separate computer file for each graphic and photograph (photos must be 300 dpi)**. Send e-mail submissions to alsadirector@langley.af.mil. ALSA Center reserves the right to edit content to meet space limitations and conform to the *ALSB* style and format.

Next issue: September 2011. Submission DEADLINE: COB 1 July 2011. Theme of this issue is "Open Warfighter Forum."

Reprints: ALSA Center grants permission to reprint articles. Please credit the author and the *ALSB*. Local reproduction of the *ALSB* is authorized and encouraged.

Subscriptions: We continue to validate our subscriber's information and requirements. If you wish to **discontinue your subscription** of the *ALSB*, please send an e-mail to alsapubs@langley.af.mil.

Mailing/Distribution: This publication is packaged for mailing and distributed by the ALSA Center at Langley AFB, Virginia.

ALSA Center Web Sites: The *ALSB* and MTTP publications are available at our CAC-enabled web site: https://wwwmil.alsa.mil. For classified ALSA MTTP publications, visit http://www.acc.af.smil.mil/alsa.

CONTENTS

Cover photo— US Soldiers conduct fast-rope insertion and extraction training using a Navy MH-60 Seahawk helicopter during exercise Southbound Trooper IX at the Military Operations on Urban Terrain site on Fort Pickett, VA., 16 Feb. 2009. (Photo by Spc. Michael Carter, USA)

DIRECTOR'S COMMENTS

The weather here in Virginia has finally begun to warm up and the Air Land Sea Application (ALSA) Center's workload of developing publications that meet the immediate needs of the warfighter continues to heat up as well. With twelve joint working groups behind us spanning six separate projects, and ten more scheduled over the next three months, 2011 looks to be a very productive year. As major events continue to unfold in Japan, the Middle East, and Northern Africa, our mission becomes more critical than ever. With your help, we will continue to create high quality and relevant tactics, techniques, and procedures (TTP) publications worthy of those serving selflessly in hotspots throughout the globe.

It should come as no surprise that all of the world-changing events happening in the past few months have occurred in urban areas. In fact, experts project that in the very near future more than half of the world's entire population will live in urban areas, with more than 80% of third world's populations continuing a migration trend to urban areas. Urban landscapes present challenging environments with numerous variables to be considered before and during the conduct of operations within their boundaries. If observations and lessons from Libya, Afghanistan, and Iraq are any indication, it is critical that we leverage aviation assets wisely to mitigate and overcome these challenges. The authors of this ALSB have done a tremendous job of displaying the different means aviation is used as a force-multiplier in the urban environment, and how we can continue to train our force to anticipate and operate effectively in future urban areas.

First up, Air Force Major Alan Docauer highlights the importance of synchronizing airspace to optimize the simultaneity of conducting numerous overlapping critical aviation missions in support of ground forces operating in urban terrain in his article "Efficient Airspace Use during Urban Air Operations." Next, in the article, "The Challenges of Urban CAS", Lt Col Lance Yarborough addresses the physical and planning challenges to conducting urban aviation operations and recommends solutions through doctrine and training. Air Force Captain Tucker Hamilton's article, titled "MC-12W: Redefining ISR in Urban Operations", highlights the advantages of using the MC-12W as not only an ISR platform, but also as a manned tactical asset that has an engaged and responsive aircrew that can interact with both supported ground forces and other air platforms in the area. In "Intelligence or Operations Asset", Marine Major R.P. Hough presents the case for putting in place multi-Service doctrine to ensure the unmanned aerial systems community and complementing manned platforms are integrated to provide simultaneous and seamless lethal and non-lethal support to ground forces in urban terrain. Finally, Air Force Lt Col James Szepesy and Army LTC (R) Casey Bain team up in their article "USJFCOM, Other Partners prep Marines to Use Aviation Assets in Afghanistan Urban Environment" to explain how JFCOM has worked with other key players to train warriors on how to best use air platforms to defeat the irregular threat in the challenging and diverse Afghanistan terrain.

Ironically enough, as little as ten years ago, doctrinal Military Operations in Urban Terrain (MOUT) manuals actually stated that "the attack or defense of a built-up area should be undertaken only when significant tactical or strategic advantage accrues through its seizure or control." While today we know full well that urban areas cannot be ignored, it is now time to embrace the fact that the vast majority of future military operations will involve the employment of aviation assets in the urban environment. We need to capture the TTP now and write it into doctrine to maximize our mission accomplishment in the future.

Farewells-I would like to wish Mrs. Bea Waggener, our editor, with the best and warmest regards in her recent retirement after 40 years of Federal Service. Mrs. Waggener's contributions to ALSA were immense and she will be sorely missed. We also have to say goodbye to MAJ Brian Bolio and Lt Col (S) Ray Zuniga as they recently departed for new assignments. However, we welcome aboard our new Army action officer, LTC Dee Broderick. We look forward to her contribution and expect great things. Enjoy the ALSA bulletin and please, as always, give us feedback!

DAVID B. HUME, Colonel, USAF

Director

EFFICIENT AIRSPACE USE DURING URBAN AIR OPERATIONS

A USAF, RQ-4A Global Hawk Unmanned Arial Vehicle sits parked on the flight line at Langley AFB, VA. A USAF E-3C Airborne Early Warning Control System (AWACS) aircraft and a USAF E-8A Joint Surveillance Target Attack Radar System (J-STARS) aircraft are parked (left-to-right) in the background as ground crews and security personnel attend the aircraft. (Photo by SSGT Lynnita Cotton, USAF)

By
Maj Alan F. Docauer, USAF

In the summer of 2007 the "surge" in Iraq was ramping up. Airspace around Bagdad that was already congested became saturated with aircraft performing a mix of missions including close air support (CAS), surface fires, intelligence, surveillance reconnaissance (ISR), airlift, and civil aviation. Most urgently, the number of troops in contact drastically grew due to the increase of forces on the ground and the missions they were performing. The crush of additional aircraft and missions overwhelmed existing tactical command and control (C2) airspace procedures. The nature of the surge; vast numbers of aircaft in congested, confined airspace; and the needs of the ground forces demanded new solutions that could be implemented immediately. Of many lessons documented from that time, a couple are worth emphasizing. They are: the importance of effective airspace prioritization and synchronization of effects based on current scheme of maneuver and ensuring the most efficient use of limited airspace. Properly applied, these could greatly aid future urban air operations.

…vast numbers of aircraft in congested, confined airspace; and the needs of the ground forces demanded new solutions that could be implemented immediately.

Why is airspace prioritization and synchronization critical in the urban environment? The reason is because of the limited volume of usable airspace. Prior to the surge, airspace prioritization was broadbrush, applied equally across the expanse of Iraq instead of being focused on scheme of maneuver in critical areas such as Bagdad. From the perception of tactical C2, although synchronization processes existed, they were effectively stove-piped. Each of the many battlespace owners around Bagdad focused on synchronizing effects inside their own battlespace and the efforts at synchronization were not effectively communicated through the ground/air C2 structure to the tactical command and control systems allocating airspace.

Why is that a challenge? Go outside and look up. You may or may not see an airplane in the sky, and it might seem like airspace is limitless so airspace utilization should be a no-brainer. Next, imagine a guy two blocks away looking up and thinking the exact same thing. Now imagine that you are part of one brigade requesting air support, and the guy two blocks away is part of a different brigade in a different division also requesting air support. Each brigade has a specific mission, need, scheme of maneuver and assigned battlespace. They are mutually supporting in a big picture way, but in the course of day to day combat the specifics of what support is required differ enough that they are in essence, two completely different requirements. Now, imagine two sets of CAS aircraft, assigned to support each of the two missions. Both sets of aircraft prefer to operate in the same altitude regime to most effectively employ advanced targeting pods (ATP) and/or weapons. Since the operations are two blocks apart, this should be no problem right? The answer isn't so simple.

Even small aircraft need room to maneuver. While a remotely piloted vehicle (RPV) can get by with less room, a set of CAS aircraft executing a 7 nm CAS wheel over a target area needs around 16 x 16 nm area of airspace to maneuver and maintain the lateral confines of the airspace. When using a common reference system such as common grid reference system (CGRS) or global area reference system (GARS), the assigned airspace for this mission rounds to a 20 x 20 nm area. This assumes a stationary mission. If it is moving the lateral requirements change in time. In the example above, the optimum volume of airspace for both missions overlaps in location, altitude, and time. In Bagdad circa 2007, multiply this problem by a scale of 10, and integrate special operations forces (SOF) requirements, ISR, aircraft (civil and military) on approach/departure from Bagdad International Airport, and surface fires, and you can start to scale the extent of the challenge.

The problem is vertical as well. In the most heavily used portions of airspace around Bagdad, it was common to have aircraft stacked at every usable altitude from the coordinating altitude up to 25,000-30,000 feet above ground level (AGL). For aircraft operating as flights/ sections, the temptation was to compress assigned blocks in order to fit more aircraft into the airspace. In addition to limiting weapons delivery options, there is only so much you can compress blocks for a flight of fighters. Typically, fighters will internally deconflict within their assigned block by using a 500-foot bubble at the bottom of the block, stack within the block at 500-foot increments, and use a 500-foot bubble at the top of the block. What this means is a two-ship requires a minimum of a 2K block, and a four-ship needs a minimum of a 3K block. Using altitude to compensate for the limited airspace volume was not the answer.

Since it wasn't possible to place more aircraft into the same airspace volume at the same time, airspace priorities became critical. Priorities are used by tactical command and control to allocate airspace to the user who has the most important need. In the case above, if one mission was supporting armed recce and the second was supporting troops in contact and troops in contact had a higher priority than armed recce, the aircraft supporting troops in contact would receive the best volume of airspace. The armed recce mission would still receive airspace but probably not at the optimal altitude for supporting their assigned mission tasking due to their lower priority.

Since it wasn't possible to place more aircraft into the same airspace volume at the same time, airspace priorities became critical.

Airspace priorities existed prior to the surge. They were spelled out

in the daily air operations directive (AOD) and were implied in priorities assigned to joint tactical air strike requests. However, they were not effectively synchronized with the needs of the ground component scheme of maneuver as a coherent, repetitive process and therefore were not always reflective of the ground commander's real-time priorities. Why is this important? A great example occurred when ISR RPVs surged looking for two missing Soldiers. This ISR mission was the priority. However, this was not universally understood by the airmen allocating airspace around Bagdad resulting in aircraft out of position to support the ground commander's priority mission. The solution was a living process of prioritization that synchronized desired effects based on the ground commander's scheme of maneuver, by division, and per named operation. This coordination, occurring through regular synchronization video teleconferences and other means and spelled out in the daily AOD gave tactical command and control the tools needed to allocate airspace based on the needs of the ground commander.

However, synchronized priorities are not enough to ensure success. To maximize air effects means maximizing the amount of missions possible over the limited volume of urban airspace. To do this, airspace must be treated as a scarce resource and be employed efficiently.

...airspace must be treated as a scarce resource and be employed efficiently.

Why does this matter? In the above example, two units supporting different operations thought they had enough airspace to work with. In reality aircraft need a certain volume of airspace to maneuver and the airspace for each mission overlaps. Therefore a certain minimum volume of airspace is required to support a task. The key is to define the minimums and assign airspace accordingly. Laterally, aircraft need enough room to maneuver based on the tactics required for the mission. That volume may be larger in an environment with surface to air threats, and smaller in a low threat environment. The volume should include a buffer allowing freedom of movement while maintaining the boundaries or confines of assigned airspace to allow for air operations in adjacent airspace at the same altitudes. Therefore, assign only the needed airspace plus a buffer (i.e., 20 x 20 nm miles or 4 CGRS keypads as in the example earlier). This ensures more airspace volume is available for other missions. Applying this methodology across the board ensures more missions are accomplished at the right altitudes for ATP/weapons employment. Rule of thumb for each aircraft is different because a B-1 requires more room to maneuver than an A-10. However, rules of thumb should be developed and used by tactical C2.

The effect of this method is dramatic. Before the surge in Iraq, it was common for aircraft supporting CAS to receive an entire CGRS kill container, or a CGRS kill box equivalent (keypad and surrounding) worth of airspace to support a mission. In most cases this amount of airspace, 9 keypads and approximately 30 x 30 nm was considerably more airspace than required. By the end of the surge, it was common to assign between 2-6 keypads for a CAS mission (depending on aircraft type/mission supported). This increased the amount of CAS aircraft that could work over Bagdad at any given time and at the most important altitude regimes. By placing CAS aircraft closer to the ground, and minimizing the stack by reducing overlapping airspace, it reduced the challenge of clearing airspace for weapons employment, helping to more quickly close the kill chain. By using only the needed amount of airspace, it also sped the process of deconflicting surface fires because less airspace volume was actively being used by other aircraft,

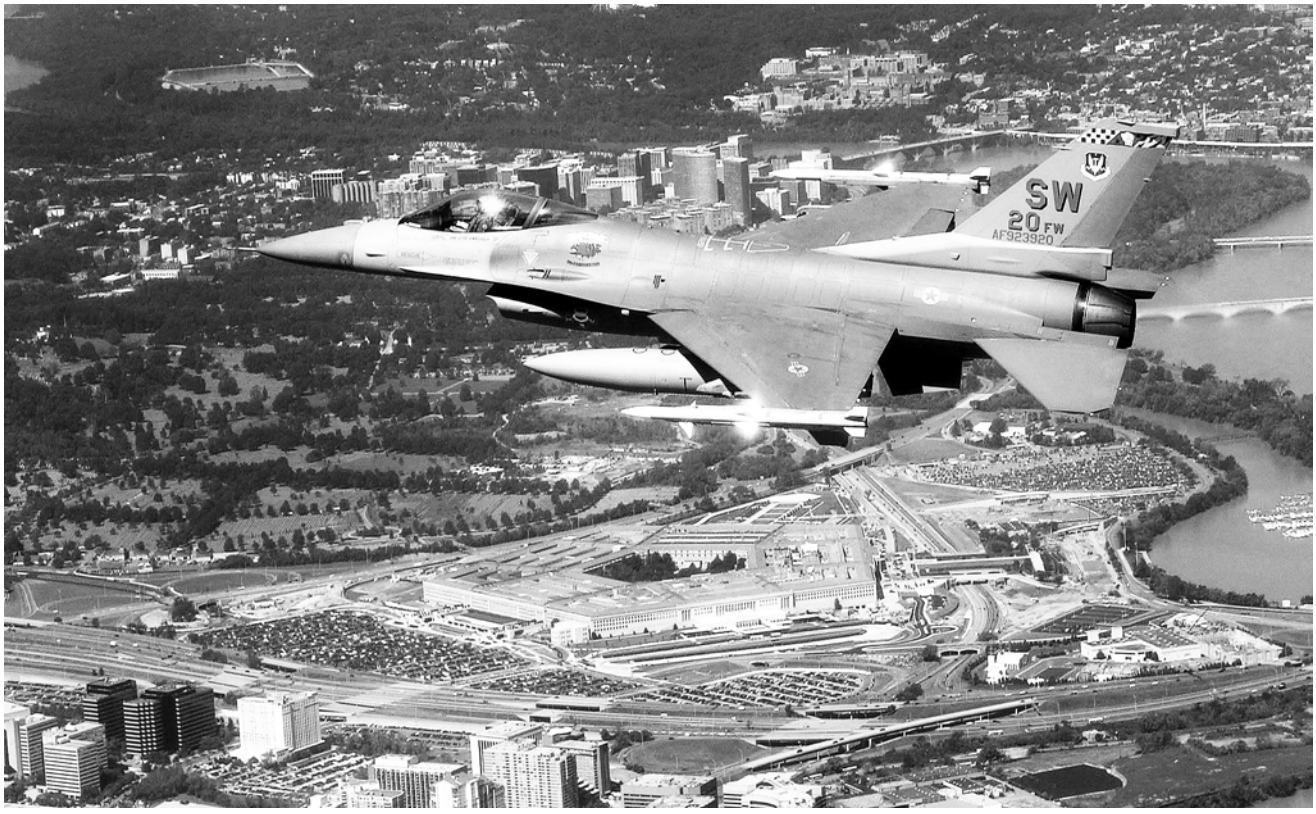
meaning there was less volume to clear. Additionally, it eased the threat exposure for civil/military airlift aircraft arriving/departing from Bagdad International Airport by increasing the airspace available for use.

Another example of efficient use of airspace involves clearing airspace for weapons delivery. Prior to the surge, airspace clearance might mean clearing an entire CGRS kill container. In the urban environment, multiple aircraft, stacked in overlapping airspace might be operating in airspace below aircraft preparing to employ. Clearing these aircraft by moving or restricting them significantly impacted their missions. Additionally, the time needed to coordinate the movement/restriction of conflicting aircraft took so long that opportunities to employ ordnance were missed due to loss of positive identification. Early solutions like clearing CGRS keypads vice kill containers helped, but were only a partial solution because a keypad is still a large volume of airspace so other missions were still affected. As a highlight of the inefficient clearance procedures, there were situations where a bomb being dropped over central Bagdad might disrupt airspace near Bagdad International Airport causing disruptions in the flow of aircraft in and out of the city in spite of the fact that the bomb was dropped many miles from the airport. The problem was largely solved by looking at what airspace was really needed to provide a corridor for the aircraft delivering ordnance. This resulted in the creation of restricted operations zone (ROZ) procedures, including standardized ROZs that minimized the disruption to other aircraft/missions by utilizing small, right-sized pillars of airspace during weapons delivery as a corridor for the bomb (or aircraft if on a strafe or dive delivery) to travel to the target. This sped the kill chain, reducing missed opportunities due the ability to quickly clear/restrict ROZ airspace. It also provided the opportunity for aircraft performing other missions in the vicinity of the attack to continue their missions while avoiding only the small ROZ.

In the urban environment, where multiple overlapping missions are simultaneously occurring, it is unlikely that every supported mission will get the desired airspace/altitude. This is due to sheer numbers of aircraft and the scarcity of available airspace volume. Ensuring synchronized airspace priorities that account for day to day changes in scheme of maneuver enable the right effect at the right time. Additionally, to maximize the number of missions possible, airspace must be efficiently used. Doing so involves developing effective, standardized procedures for using only the minimum airspace. This helps maximize the number of missions possible in a confined area, as well as facilitating surface fires and weapons delivery. It also reduces mission impact on other systems during air/surface fires and can speed the kill chain by reducing the time required to coordinate/clear airspace.

Ensuring synchronized airspace priorities that account for day to day changes in scheme of maneuver enable the right effect at the right time.

THE CHALLENGES OF URBAN CAS



An F-16 Fighting Falcon flies over the Pentagon as part of Operation Noble Eagle recently. The aircraft is assigned to the 20th Fighter Wing at Shaw Air Force Base, SC. (Photo by SSGT. Aaron D. Allmon II, USAF)

By
Lt Col Lance "Shack" Yarborough, USAF

"As hubs for air, land, and sea travel, cities can rarely be bypassed, particularly if operations require the movement of military and/or humanitarian supplies into and throughout a region."

As the US government continues to deploy military forces to foreign countries as part of the overseas contingency operations (OCO) these forces will be faced with more and more hostile situations. "As hubs for air, land, and sea travel, cities can rarely be bypassed, particularly if operations require the movement of military and/or humanitarian supplies into and throughout a region."[1] Therefore, US forces will be required to operate in these urban areas and face the unique threats that they possess.

It is for this reason that "analyzing, defining, and developing an urban-focused operational capability within our armed forces has received heightened emphasis as of late. This emphasis has manifested itself in a number of key national security documents, national policy findings, war-gaming initiatives, independent analytical studies, and operational 'lessons learned' reports."[2] These documents have unanimously stated the need for improved urban capabilities to deal with the increased probability of conflict in these regions.

Based on this increased likelihood of urban warfare in the future, let us more closely consider some of the challenges of this environment to military operations – to both air and land forces. We will first consider the characteristics or physical make up of a typical urban area. Then, we will consider some of the planning challenges of military urban operations, to include rules of engagement (ROE) considerations and target identification problems. Finally we will look at the physical challenges of employing military

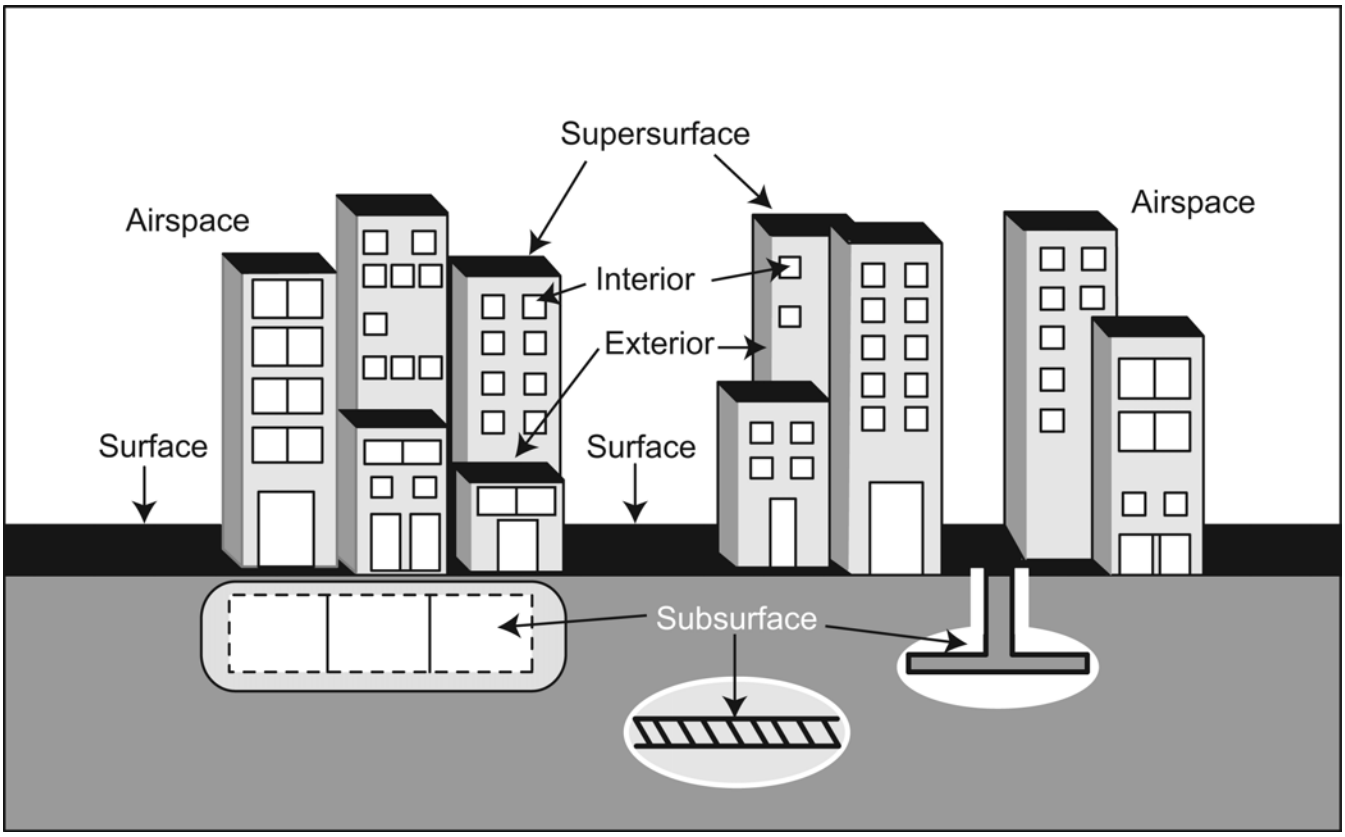


Figure 1. Urban Terrain (SOURCE: Joint Publication 3-06, *Doctrine for Joint Urban Operations*, 8 November 2009, II-1)

forces in the urban arena, to include the difficulties of aerial targeting and target identification.

Let us begin by taking a closer look at the differences between an urban environment and more traditional maneuver territory. Figure 1 shows a graphical representation of urban terrain.

Capt Troy S. Thomas describes the urban area as follows:

The urban system is unique in that it consists of five dimensions or spaces. First, the airspace above the ground is usable to aircraft and aerial munitions. Second, the supersurface space consists of structures above the ground that can be used for movement, maneuver, cover and concealment, and firing positions. For airmen, the supersurface warrants special consideration since the enemy can locate weapons such as surface-to-air missiles or antiaircraft artillery there. Structures also channel or restrict movement at the surface. Third, the surface space consists of exterior areas at ground level, including streets, alleys, open lots, parks, and so forth. Fourth, the subsurface or subterranean level consists of subsystems such as sewers, utility structures, and subways. Although often overlooked, the subsurface space is more exploitable than one realizes because these elements exist as part of a city's planned infrastructure; therefore, they have known relationships and nodes. The fifth domain is the information space[3].

Another way to highlight the difficulties presented by urban operations is to compare it to other types of military combat environments - specifically desert, jungle, and mountain. Joint Publication (JP) 3-06, Doctrine for Joint Urban Operations, lists several characteristics of military operations and rates each terrain type on its effect on these operations. Some of these characteristics include the number of non-combatants, the amount of valuable infrastructure, available avenues of approach, logistical requirements, and detection

Some of these characteristics include the number of non-combatants, the amount of valuable infrastructure, available avenues of approach, logistical requirements, and detection and engagement ranges.

…the urban setting was rated as the most challenging to military operations.

and engagement ranges. In each of these categories the urban setting was rated as the most challenging to military operations. While some of the other environments received a similar rating in one or two categories, only the urban setting was deemed the most difficult in all of them.[4] Figure 2 provides a comparison of the environments.

Now that we have a better understanding of some of the physical challenges of the urban environment, let us examine some additional factors that complicate these operations. In its Aviation Urban Operations publication, the Air Land Sea Application (ALSA) Center Subject matter experts identified several considerations that make the planning of urban aviation operations unique.[5] We will examine several of these challenges and discuss how they complicate urban military operations.

The urban canyon created by multistory buildings can cause significant problems for ground forces as well as aviation assets. This phenomenon significantly restricts line of sight, which in turn affects many aspects of military employment, from radio communications to weapons trajectory. Ground forces at street level in an urban canyon will have a reduced capability to communicate with one another or with aircraft that are not directly overhead. Additionally, the large number of structures limits the ground force's visual field of view, preventing them from knowing what is just around the corner. Air assets are also affected by this field of view problem. Any structures between the aircraft and a point of interest will require the aircraft to fly at a higher altitude to see "over the building." This increased altitude may not always be possible due to weather or deconfliction from other aircraft. Flying directly overhead mitigates this problem, but only for the short duration that the aircraft can maintain this position. Flying overhead also has the potential to highlight the target, which may allow a mobile target to escape attack.

Characteristic	Urban	Desert	Jungle	Mountain
Number of noncombatants	High	Low	Low	Low
Amount of valuable infrastructure	High	Low	Low	Low
Multidimensional battlespace	Yes	No	Some	Yes
Restrictive ROE	Yes	No	No	No
Detection, Observation, and engagement ranges	Short	Long	Short	Medium
Avenues of approach	Many	Many	Few	Few
Communications functionality	Degraded	Fully Capable	Degraded	Degraded
Logistics requirements	High	High	High	Medium
Freedom of vehicular movement and maneuver	Low	High	Low	Medium

Figure 2. Comparison of Operations in Urban and Other Environments (SOURCE: Joint Publication 3-06, *Doctrine for Joint Urban Operations,* 8 November 2009, I-1)

A U.S. Air Force pilot flies an F-16 Fighting Falcon aircraft, assigned to the 18th Aggressor Squadron, 354th Fighter Wing, over the Joint Pacific Alaska Range Complex, near Eielson Air Force Base, during a simulated combat sortie April 18, 2011, as part of Red Flag-Alaska. Red Flag-Alaska is a series of Pacific Air Forces commander-directed field training exercises for U.S. forces, providing joint offensive counter-air, interdiction, close air support, and large force employment training in a simulated combat environment. (Photo by SSgt. Christopher Boitz, USAF)

Another consideration of urban operations is the increased risk of fratricide. When ground forces are operating inside structures, air assets likely will not know their locations. Aircrews will be reliant on ground controllers to ensure that no friendly forces are a factor to any targets they are tasked to destroy. Due to the rapid and sometimes uncertain nature of fighting in urban areas, this confirmation process has resulted in several cases of fratricide in the past. Unless the ground forces are able to somehow identify a structure that they are operating in to the aircraft, the risk of fratricide will remain high until technologies allow for improved situational awareness of ground forces directly to the cockpit.

As a result of these uncertainties, aircrews can expect to operate under restrictive ROE. "Urban warfare ROEs adhere to international law and are no different inside than outside of cities, just generally more difficult to comply with."[6] At the tactical level, restrictive ROE have the potential to increase risk as it may drive specific attack headings or lower attack altitudes. These restrictions reduce the flexibility of the attacking aircraft, making it more predictable and increasing the chances for a successful engagement by enemy air defense forces.

…restrictions reduce the flexibility of the attacking aircraft, making it more predictable…

Another driving factor requiring strict ROE is the desire to reduce collateral damage (CD) and civilian casualties. CD received great attention during OIF and will remain a

factor in all future military operations. The closeness of structures in the urban setting requires CD to be more acutely considered than in other environments. Situations may arise where a known location of enemy forces cannot be targeted due to innocent civilians either being in the same structure or in close vicinity. The Al Firdos bunker bombing during Desert Storm, which killed over 200 civilians, is an example of how collateral damage can be even more of a factor in urban areas.

Going hand in hand with collateral damage and ROE is the problem of positive target identification. This challenge is not unique to air assets, but also applies to the ground forces as well. The Al Firdos bunker was a legal target during Desert Storm, but unknown to the US, the upper floor was occupied by family members of the Iraqi military. Over 200 civilians were killed in the destruction of this target. If the adversary's conventional forces melt into the landscape and begin a more insurgency-style fight, the ability to definitively identify personnel as hostile is reduced. When enemy soldiers are wearing a military uniform and carrying standard issue weapons, this identification is simplified. From the aircrew perspective, target identification of personnel will be heavily reliant on ground controllers or other off board assets until technologies allow for improved target recognition capabilities. While hostile acts such as mortar firing can typically be observed from tactical aircraft, clearance to expend ordnance will normally be required from the ground forces commander via a Joint Terminal Attack Controller (JTAC). The JTAC can enhance ground commander situational awareness with equipment like the Remotely Operated Video Enhanced receiver (ROVER). Although a ROVER feed from an overhead fighter or UAV can aid in target identification and can help reduce fratricide, the ground commander must still make a decision to strike by understanding the ROE and weighing the collateral damage and civilian casualty risk.

"Urban warfare ROEs adhere to international law and are no different inside than outside of cities, just generally more difficult to comply with."

The urban battlefield has been demonstrated to be extremely demanding and deadly in both past and current operations. As we see military operations increase in unstable regions of the world, urban warfare will become a more common occurrence. Although there are many unique challenges to the employment of the joint air-ground team, training and doctrine can overcome many of them. The Services should consider a common approach on the use of CAS assets in the urban setting and disseminate that through Service specific doctrine and tactics manuals. ALSA's Aviation in Urban Operations is a good start.

End Notes:

[1] Capt Troy S. Thomas, "Slumlords: Aerospace Power in Urban Fights" Aerospace Power Journal, Spring 2002, n.p., online, Internet, 25 March 2002, available from http://www.airpower.maxwell.af.mil/airchronicles/apj/apj02/spr02/thomas.html.

[2] Lt Gen Norton A. Schwartz and Col Robert B. Stephan, "Don't Go Downtown Without Us" Aerospace Power Journal, Spring 2000, n.p., online, Internet, available from http://www.airpower.maxwell.af.mil/airchronicles/apj/apj00/spr00/schwartz.htm.

[3] Thomas, n.p.

[4] Joint Publication 3-06, Doctrine for Joint Urban Operations, 8 November 2009, I-7.

[5] FM 3-06.1, Aviation Urban Operations, 9 July 2005, I-1,II-1.

[6] Thomas, n.p

MC-12W: REDEFINING ISR IN URBAN OPERATIONS

US Air Force Lt. Col. Douglas J. Lee, commander, 4th Expeditionary Reconnaissance Squadron, performs a walk around inspection of a MC-12W Liberty aircraft prior to boarding it for a mission at Bagram Airfield, Afghanistan, 27 Feb 2010. (Photo by SSgt Manuel J. Martinez, USAF)

By
Capt Tucker Hamilton, USAF

BACKGROUND

Intelligence, surveillance and reconnaissance (ISR) was the driving force behind the development of early military air vehicles. It was this perched vantage point that changed warfare. Observing the fight turned into attacking from the skies, which turned into air-to-air combat. ISR was always a cornerstone of airpower but mainly was used in a very strategic, broad, sense—the collection of information that was in-turn analyzed and presented back as intelligence to military forces. The turnaround time of information to intelligence has truly shrunk through the decades and continues to do so. Due to the efforts of the intelligence community, ISR has become readily useful within minutes of collection and has recently experienced a complete revolution as the MC-12W has bridged the gap between traditional and tactical ISR. The ground forces no longer must wait for ISR in order to gain battlefield situational awareness (SA), they have flexible ISR at their fingertips and an added level of air integration never before seen. It is important to note that armed remotely piloted aircraft (RPA) attempted to fill this gap starting a decade ago, but have lacked the battlefield awareness to truly provide the full spectrum of support needed by the ground forces. This gap is truly evident in the urban environment, as the amount of information being collected and the required speed of dissemination can easily overwhelm a latent platform. Not to say RPAs will not make the leap; but that leap, and all others into the tactical ISR world, will be off the shoulders of the MC-12W.

The ground forces no longer must wait for ISR in order to gain battlefield situational awareness (SA), they have flexible ISR…

TACTICAL ISR

Tactical ISR is real-time information sharing and intelligence, with the capability of immediately impacting the tactical battle space. A quick note: information is the raw data and intelligence is that same data after it has been professionally analyzed. Sometimes ground forces just need information in order to make quick, life and death decisions, while other times the same ground forces need a trained imagery analyst

to provide them intelligence. Tactical ISR is not always, in fact rarely, life and death information passing. It has the capability, but is more commonly preemptively collecting on desired targets in a battle space. Either gathering intelligence on a future target (more traditional ISR) or providing information and intelligence to ground forces while they go about their usual business; clearing a route of improvised explosive devices (IED's), looking for enemy traffic through a mountain pass, providing overwatch during a local shura, etc. The smooth transition from traditional ISR into different types and levels of ground forces support is what makes tactical ISR so tactical.

Another key to tactical ISR is the relationship that the aircrew builds with the ground forces.

Another key to tactical ISR is the relationship that the aircrew builds with the ground forces. This begins with pre-mission planning, continues through mission execution, and finishes with providing analysis used by the ground commander for future operations. A key aspect of the MC-12W program is the ISR exploitation cell (ISREC). This "cell" is part of the MC-12W squadron and works on the mission planning and post-mission products, as well as providing real-time professional analysis off the airplane's video feed. The mission planning starts with the ISREC working with the ground forces intelligence officer (S2) hours before the mission is flown. The aircrew also accomplishes pre-mission planning by contacting the ground forces they will be supporting. Not the S2 this time, but the actual joint terminal attack controller who will be speaking with and controlling the aircraft while it is overhead. Both sets of pre-mission planning, ISREC and aircrew, are extremely important and build those vital relationships.

Multiple times the aircrew will call the supported unit before stepping to the airplane and find out that the ground forces need to change the aircraft start point, or need to change the focus from one mission set to another, or possibly that they are currently being attacked and need the crew to get overhead as quickly as possible. All of which affect the urgency and focus of the crew and give the supported unit buy-in to how they want and need support. I stress this point because this is not what ISR was before the MC-12W. It was, and still is to a large part, about executing a mission planned days prior, even if that mission is no longer desired or relevant, and not about flexible supported unit coordination.

CREW AND CAPABILITIES

The standard MC-12W crew complement consists of four airborne crewmembers, one crew on the ground and multiple other supporting team members. The airborne crew is made up of a mission commander (MC) that facilitates all other crew positions; a copilot that ensures effective aircraft placement; a Sensor Operator who runs the camera that hangs from the bottom of the aircraft; and the cryptological operator (CO) who works on special intelligence. The ground crew member is an imagery analyst (IA) that monitors all feed coming from the platform and provides crucial input based on what they see.

For the most part, all of the aircrew can speak on one of the multiple mission radios. A mission radio is one made specifically for contacting ground troops and has the capability to be secured from interception. Each crew position also has capability to view the camera feed, while the sensor operator controls the camera and can adjust multiple settings. The IA has direct communication with the aircraft and can see the video real-time. They also record the video and have playback capability.

All crewmembers can support each other during missions or every-

one can be executing their own mission set. It is quite remarkable to have multiple intertwined missions that effortlessly flow back and forth; in the end—all supporting each other and the ground forces.

MISSION CAPABILITY

The beauty of the aircraft is the multifaceted simultaneous mission set capability. What the MC-12W is providing is a flexible and engaging airborne asset, from start to finish, that is its main goal—satisfying the ground force commander's intent. The aircrew can easily and quickly look outside and assess the weather and/or target information and make appropriate orbit adjustments. MCs can easily change which sensor on the aircraft is going to take priority and assess which intelligence gathering method will be most effective based on all the information they are processing real-time. An actual example: following a high value individual in a car, the copilot looks outside and notices that the car is approaching a convoy a few miles down the road. As a crew, they quickly track down the radio frequency of that convoy, call them on the radio, and tell them to stop the car before it passes—flexible, engaging, tactical ISR.

The MC-12W is most useful working directly for ground forces real-time, vice collecting pictures of a prescribed target deck. The aircraft has exceptional radio communications, full motion video (FMV) sharing capability, sensor flexibility, and overall battlespace SA. Multiple capabilities are not addressed in this article due to classification, but suffice it to say; the MC-12W can work three distinct mission sets simultaneously and can stay directly overhead the ground forces for hours.

URBAN OPERATIONS

The urban environment lends itself to a number of MC-12W advantages. One being that the aircraft can fly lower because of the increased urban noise level. Hearing the aircraft usually occurs before seeing it, so if the surrounding ground noise is loud then the aircraft can sneak lower and still be undetected. With a lower altitude comes better sensor fidelity. This fact is true for all air assets in an urban environment.

Altitude aside and more uniquely, the MC-12W flourishes when busy streets and multiple target buildings are under the camera. This is where the five crewmembers engaged with the video feed will make a marked difference. Parts of the screen can be divided and monitored in sections by all five aircrew and they can also make split-second radio calls if needed. When it gets interesting; i.e., busy, the crew continues to tackle the problem by divvying out radio responsibilities. During an urban situation, the copilot has the added benefit of an additional sensor—looking outside the window. They can track cars, monitor traffic into and out of a checkpoint, and provide the crew and troops with wider battlefield SA.

Urban environments really require a low-to-no latency feedback loop. With the MC-12W the ground troops can ask for the camera to move and it can be immediately adjusted. Feedback response time is basically nothing; and when personnel and/or vehicles are moving in and out of building shadows and entering/exiting compounds every few seconds or less, immediate feedback is what is needed.

Urban environments really require a low-to-no latency feedback loop.

Another MC-12W capability that needs to be stressed during urban operations is the playback capability that the IA brings. With an ever-shifting ground picture, having a professional analyst throw in their two cents within seconds can mean life and death. A real world example: an MC-12W is flying over an outpost searching for enemy movement because of a recent mortar attack on

the base. They spot an individual moving through fields with a long cylindrical object. The individual crouches down and then a bright flash and subsequent smoke tumbles out of that object. Ground troops are closely watching the video feed and immediately start getting coordinates to start dropping mortars on the enemy firing on the base. In the mean time, the MC-12W has the IA look back at the feed to assess the situation. Within 30 seconds, the IA comes back over the radio and says it is a bird hunter and not enemy forces. What brings them to that conclusion is beside the point and they definitely can make wrong calls, but that is why the MC has the final say. With that being said, they are highly trained and very good at what they do. Continuing with the example: the fact that this is a bird hunter is immediately passed to the friendly forces, ultimately saving a civilian's life. Scenarios like this play out more often than not and prove the necessity of an immediate ISR feedback loop.

The MC-12W is not just an ISR platform, but a tactical asset that has an engaged aircrew and multiple capabilities that interact beautifully with air and ground assets alike.

The last advantage of effective urban use with the MC-12W deals with building blanking. One of the difficulties of an urban environment, from the sky, is all the places people and things can be hiding. This is overcome if the aircraft can easily shift its orbit and maintain camera on—which is solved with flexible, interactive crew involvement. It is easy to shift orbits, a little harder to change altitude, but shifting an orbit very quickly is a matter of just doing it. Additionally, what is going to become a blanking problem in 20 seconds can be negated by the crew moving the orbit real-time.

Ground forces can best utilize the MC-12W in an urban environment by being clear on their objectives and priorities and keeping the aircrew updated on any changes. Also, they should not be afraid to use the video feed and tell the crew how to adjust the camera to get what they want. After all, the ground forces know their area of operations and what is typical behavior from the populace. The MC-12W is there to support and facilitate, and that mentality, coupled with a minimal feedback response loop, makes it a very flexible platform.

CONCLUSION

The MC-12W is not just an ISR platform, but a tactical asset that has an engaged aircrew and multiple capabilities that interact beautifully with air and ground assets alike. It supports the ground forces like no other ISR asset and has the capability to bring the Air Force and ground forces to an intertwined level of tactical execution. It is arguably the Air Force's most important step forward for ISR, as it breaks the current mold and embraces tactical execution. The MC-12W is redefining ISR—how ISR interacts with ground forces, how real-time information is best analyzed and conveyed, and how flexibility and interaction with multi-faceted, simultaneous, sensor allocation is shaping the battlespace and defining a new level of air-to-ground interoperability.

INTELLIGENCE OR OPERATIONS ASSET?

Tennessee Army National Guard Sgt. Ken Kay, 278th Armored Cavalry Regiment, prepares to launch a RQ-7 Shadow 200 Tactical Unmanned Air Vehicle for a mission at Forward Operating Base Warhorse, Iraq, on 28 May 2005, during Operation Iraqi Freedom. (Photo by SSgt. Suzanne M. Day, USAF)

By
Major R.P. Hough, USMC

On 10 February 2010 the 7th Marine Regiment moved its battalions into attack positions for its largest operation to date in the war in Afghanistan. As the operation began to unfold, 1st Battalion, 6th Marines (1/6), attached to the 7th Marine Regimental Combat Team (RCT-7) lost satellite communication (SATCOM) with their higher headquarters as they moved into attack positions in the southern Afghan city of Marjah. The Marines, expecting fierce fighting, immediately came under simultaneous attack from three sides. The only external asset that had line of sight radio communication with the Marines was the small RQ-7B "Shadow" unmanned aircraft being flown by a fixed wing Marine Unmanned Squadron (VMU) out of the main Marine base, Camp Dwyer, in Helmand Province. The Shadow, monitoring the situation from above, was able to provide situational awareness by passing the coordinates of one enemy position and providing effective adjustments to the Marines for their organic direct fire weapons on the other two positions. As this was happening, the battalion air officer made repeated attempts to establish external communication and declare "troops in contact" (TIC) to receive immediate close air support (CAS). Still unable to reach higher headquarters on SATCOM, the air officer relied on information from the unmanned Shadow overhead to make the urgent request. As an Air Force unmanned MQ-1 Predator was redirected from another mission to provide support, the air officer was unable to establish two-way radio communication that

The Shadow… was able to provide situational awareness …

was needed to use the aircraft's single Hellfire missile. The Shadow crew, acting on their own initiative, quickly established communication with the Predator crew (flown out of Creech Air Force Base in Nevada, 8,000 miles away) and passed a 10-digit grid for three enemy fighters in the prone position who were firing on the Marines. Inside the VMU combat operations center (COC) the Shadow crew, using a real-time video enhanced receiver, was able to view the Predator's video feed on a high-definition 42" screen and verify it had acquired the correct enemy position. The Shadow mission commander remained on station acting as a radio relay between the battalion and Predator crew until direct radio communication was established. After pushing the Predator through three different frequencies, radio communication was established and the Shadow was redirected to another forward air controller (FAC) within the battalion. Meanwhile, the enemy dropped their weapons and fell back into a nearby compound where positive identification was lost. No longer able to deliver ordnance due to the rules of engagement (ROE), the Predator provided over watch for the remainder of its time on station.

…the Shadow crew, using a real-time video enhanced receiver, was able to view the Predator's video feed … and verify it had acquired the correct enemy position.

One might view the situation described as a CAS failure since the Predator never employed ordnance. CAS, however, is not synonymous with close bombing support. The level of support required in today's, and likely tomorrow's, restrictive ROE environment will look more and more like what was provided to 1/6 in Marjah. The difference is that within the next year, the Marine Corps will begin arming the tactical Marine unmanned aircraft system (UAS) (Shadow and a more capable follow on system) that will make it unnecessary to wait for another platform to check on station, correlate, and then attack a target.

The ability of a small tactical Marine UAS to do the intelligence collection leading up the operation and then conduct all the air coordination for a battalion on the move is remarkable, but it only demonstrates a fraction of the integration being achieved by Marine VMU squadrons collocated with their supported ground units in Afghanistan and controlled by a competent fires oriented crew. On other occasions, the Shadow was able to rewind and freeze video images from a weapons attack, match it up with other imagery, and provide immediate, high fidelity, battle damage assessment (BDA) before the FAC or aircrew knew the outcome. This integration, with tactical UAS providing pre-mission pattern of life, positive identification, target attack, and battle damage assessment will increasingly make the armed tactical UAS the ground commander's most requested asset.

The VMU-3 commanding officer, and mission commander during the above vignette, Lieutenant Colonel James "Chewy" Frey, is convinced that the operational limitations of tactical UAS are only limited by imagination. Frey, speaking about his coordination with other aircraft and the ground forces, stated that when they are "backed up by Shadow, we maintain positive identification (PID), can shift his targeting pod, provide an infrared (IR) mark, laser mark, or derive CAT II TLE (highly accurate) coordinates for Joint Direct Attack Munitions (JDAM or GPS guided bombs), High Mobility Artillery Rocket System (HIMARS or GPS guided high mobility artillery rocket system), Excalibur (GPS guided artillery shells), or just a bomb (non-precision). It's amazing and only limited by imagination. The imagination is the result of having a fighter community FAC (Airborne) and tactical air controller (Airborne) back-ground for the first time in the [UAS] community." These capabilities are far outside the expertise of the intelligence community and

demonstrate a need to place tactical UAS under operational control.

In a restrictive ROE environment, where aviation fires may not be approved, the UAS, with long on station times and high fidelity sensors, can still provide invaluable intelligence and targeting as well as communication reach back to support the ground force commander.

While the coordination described in the vignette is noteworthy, it would be unnecessary if the UAS was armed and able to strike immediately upon confirming PID. The Shadow is expected to carry low collateral damage, precision-guided weapons by the end of 2012. The organic capability to establish PID and then quickly strike a mobile, fleeting target will change how ground forces fight insurgents with tactical UAS and coordinated CAS.

Starting as early as 2016, Marine unmanned systems will take another giant leap forward, from the planned Shadow armed with small 81mm mortar-sized ordnance, to a future platform equipped with the precision-guided missiles and bombs carried today by large Predator-like (MQ-1) platforms (possibly the Army Grey Eagle UAS). The Group 4 UAS will be capable of providing ten times the on-station time and twice the range of today's F/A-18 Hornet while providing the speed of the MV-22 Osprey and as much ordnance as a combat loaded AV-8B Harrier. This capability leap will allow the Marine Corps to redefine the scope and speed of conducting CAS, positioning it well for the post-Afghanistan conflicts of tomorrow.

…organic capability to establish PID and then quickly strike a mobile, fleeting target will change how ground forces fight insurgents with tactical UAS and coordinated CAS.

U.S. Marine Corps CPL Stefan Ayotte, right, aviation net support, Detachment Alpha, Marine Air Support Squadron 6, Marine Air Control Group 48, rechecks a coordinate of interest on a map within the Direct Air Support Center during exercise Javelin Thrust 20 June 2010, in Hawthorne, NV. More than 4,500 Marines were participating in the exercise. (Photo by Capt Keith A. Stevenson, USMC)

The UAS intel/ops question is not going away once the war in Afghanistan comes to an end. Today's budget conscious Department of Defense will increasingly push the UAS into the realm of manned aviation mission sets due to their reduced cost and logistical burden. A Shadow, using eleven gallons of fuel, can provide up to six hours on station compared to more than fifteen-hundred gallons for an hour on station from a Harrier. Although the new systems will likely be very expensive, they require about a quarter of the manpower to operate. With over 90 percent of the fixed-wing combat sorties being flown for non-traditional ISR (NTISR), it makes sense from a cost perspective to reserve missions searching for targets and providing reconnaissance for UAS while saving costly jet aircraft hours for more dynamic missions requiring greater firepower or pilot interaction. It must be clearly understood however that capable UAS cannot replace the capabilities of advanced manned fighter/attack platforms such as the Joint Strike Fighter (F-35). Rather, they can greatly increase our operational efficiency.

…while saving costly jet aircraft … however that capable UAS cannot replace the capabilities of advanced manned fighter/attack platforms

After a decade of war against fractured insurgent forces, the Marine Corps is developing operating concepts for the Marine air-ground task force (MAGTF) "to become lighter, more adaptable, more resourceful and faster in relation to the enemy." This concept, called Enhanced MAGTF Operations or EMO, is distributed in nature with semi-autonomous units spread throughout the battle space. It places a premium on intelligence collection and the ability to immediately strike individual hostile targets with minimal collateral damage. In some cases it will take hours, if not days, for an opportunity to strike a target with minimal collateral damage. These targets, interspersed with civilian populations, are best serviced by the airborne drones being developed today.

Doctrinally, UAS platforms, even when armed and used for CAS, are still considered intelligence collection assets. The only reason the Shadow was able to rapidly provide support in the event described above was because of innovative aviators in the VMU and battalion. The VMU commander, with no previous UAS experience before taking command, had extensive command and control experience in combat as an F/A-18 weapon systems officer, forward air controller (airborne) and on the ground as an air officer. Because he saw the potential of the unmanned system, he aggressively advertised its operational capability and integrated it into the ground scheme of maneuver. His previous combat deployments and his career of fires experience gave him a detailed understanding of combined arms in support of the ground scheme of maneuver. He told the then Assistant Commandant of the Marine Corps, General James F. Amos, that his VMU, if armed, would have killed more enemy fighters than the entire MAGTF aviation combat element (ACE) combined. This claim is not far-fetched. The VMU flew thousands of hours where it often observed enemy fighters emplacing roadside bombs, setting ambushes, and maneuvering on Marine forces.

Marine doctrine and operating concepts speak about the necessity to operate in the "intersection of complex environments, hybrid threats… and rely as much on 'non-kinetic' ability of the MAGTF as they will on the violently 'kinetic' abilities". All Services will have to train and prepare for large scale conventional wars, but a majority of time and resources will be spent on conflicts in the world's developing urban backwaters, conducting intelligence, surveillance, and reconnaissance (ISR). The geographical dispersion of future threats will make it increasingly more difficult to position and provide timely fires platforms collocated with small unit friendly forces. This faceless

adversary, interwoven in the civilian populace, will be extremely hard to find, yet once located, relatively easy to kill. The UAS can provide a cost effective means to deliver local fires until other more lethal platforms such as the F-35 or artillery can support if needed.

Former Chief of Staff of the Army, General Eric Shinseki, once admonished his own Service by saying, "If you dislike change, you're going to dislike irrelevance even more." The seam between intelligence collection assets and operational air support needs to be doctrinally solved among all the Services. If the best CAS platform for a mission is an armed unmanned aircraft that has 15 hour's time on station, it should be requested and sourced through the operational air tasking order process with the intelligence and operational communities fused together. This goes counter to current sourcing for UAS and joint doctrine from Joint Publication 3-09.3 which states, "The intelligence officer is the source of targeting data. He provides current and timely CAS targeting information, (and) serves as the focal point for ISR systems that feed real time or near real time battlefield intelligence." As the time to kill has been decreased with the collection assets conducting their own strikes, the JTAC (or FAC), with the UAS operator, have become both real-time intelligence collector and operational controller. This is not to say the controllers are the best equipped to analyze hours of ISR and electronic warfare missions. Complex missions, which change in a matter of seconds from area observation and analysis to target strike, highlight the need to create better fusion between the intelligence and operations communities. Sound doctrine, tying together the two communities together will force institutional changes that will allow the simultaneous or seamless transition of the two complementary missions, reducing the time to kill, making our forces more lethal.

… The seam between intelligence collection assets and operational air support needs to be doctrinally solved among all the Services.

An F-16 Fighting Falcon from Luke Air Force Base flies over Cold Lake, Canada during the Maple Flag exercise 3 June. (Photo by Neil Pearson, CTR

USJFCOM, OTHER PARTNERS PREP MARINES TO USE AVIATION ASSETS IN AFGHANISTAN URBAN ENVIRONMENT

The aircrew of a Marine UH-1 helicopter prepares to insert an Army Joint Fires Observer near a village during exercise Spartan Resolve to provide overwatch for friendly ground forces. (Photo by LTC Casey Bain, USA (RET)

By
LtCol James Szepesy, USMC and
LTC Casey E. Bain, USA (RET)

U.S. Joint Forces Command (USJFCOM) joint fires experts joined Marine Corps Tactics and Operations Group (MCTOG) and other joint enablers during a recent mission rehearsal exercise (MRX) to prepare Marine Corps Regimental Combat Team-8 (RCT-8) stationed at Camp Lejeune, N.C. for its upcoming deployment to Afghanistan.

…the training conducted was an important step to improving the deploying unit's ability to integrate joint fires assets at the tactical level…

According to Army senior leaders supporting the exercise, the training conducted was an important step to improving the deploying unit's ability to integrate joint fires assets at the tactical level; especially important in this training was developing the staff's ability to fully leverage aviation assets and capabilities in the challenging urban environments of Afghanistan.

MCTOG uses its Battle Staff Training Program (BSTP) exercise Spartan Resolve to prepare deploying USMC Regimental and Battalion staffs. That training is currently focused on counterinsurgency operations (COIN) in Afghanistan.

COIN relies heavily on the use of both manned and unmanned air assets in urban and rural terrain. Aviation assets help maximize the ground commander's ability to more effectively and efficiently conduct operations in an irregular warfare environment that many times encompasses complex urban environments.

Aviation plays a crucial role in the success of friendly forces during the conduct of urban operations. The ability for aviation assets to provide timely and accurate intelligence, sur-

veillance, and reconnaissance (ISR) information to the ground commander directly impacts time sensitive and mission-essential decisions on when and what types of forces to employ that will facilitate mission accomplishment while minimizing the potential of fratricide and collateral damage.

While using aviation assets in urban areas, it is important to employ specific tactics, techniques, and procedures (TTP) associated with the conditions found in built-up areas or areas with diverse civilian populations.

Underestimating the challenges posed in urban terrain, even rudimentary urban terrain in the Marine Corps area of operations in Afghanistan, can yield negative results. Things from the tactical insertion of forces, to close air support, to aerial evacuation and resupply are touched by TTPs. We train to get it right the first time while maintaining the sensitivities to cultural and religious customs of the local population.

Within the context of the COIN fight in Afghanistan and the compartmentalization of urban areas, aviation assets often have better vantage points to positively identify combatants and noncombatants as ground forces may be obstructed by buildings, walls, or other cover.

As operations move from nonkinetic to kinetic and back to nonkinetic, understanding how to integrate aviation in OEF's villages, district centers, and farmlands is one of the training values of Spartan Resolve.

Marine Light Armored Vehicles (LAVs) were used as part of the command and control structure employed at exercise Spartan Resolve. (Photo by LTC Casey Bain, USA (RET)

"MCTOG does an excellent job of integrating joint assets to replicate a near-real-world environment," said Army Lt. Col. Alfonso Plummer, JFIIT's exercise lead. "Our mission was to help integrate joint fire enablers to improve the unit's targeting process, and reinforce vital TTP that will shorten the unit's learning curve once in country as well as enhance their combat effecttiveness and ultimately save lives."

"This kind of pre-deployment training is an absolute necessity for any unit that expects to fight and win on today's battlefield," Plummer continued. "The operational environment today demands warfighters fully understand and employ crucial joint capabilities that couldn't have been imagined a few short years ago. Spartan Resolve is an excellent example of providing that mission-like experience to our leaders and staffs that prepares them for success downrange."

Exercise Spartan Resolve, led by MCTOG with support from USJFCOM's Joint Fires Integration and Interoperability Team (JFIIT) and the Air Force's 505th Operations Squadron's Joint Integration Team (JIT), included academic instruction, a command post exercise, and a live fire event.

"The training exercise focused on integrating joint, coalition, and interagency partners in a live, virtual, and constructive environment replicating conditions commanders and staffs will experience once deployed," said Marine Corps Lt. Col. James Szepesy, MCTOG's aviation integration lead at Marine Corps Air Ground Combat Center, Twentynine Palms, Calif. "The JFIIT, 505th, and MCTOG team provided the training audience with a combat-like experience that will pay important dividends to the entire unit."

The 505th Operations Squadron's JIT, from Nellis Air Force Base, Nev., provided MCTOG with a fully functional Theater Battle Management Core System (TBMCS) replicating the capabilities the Marines will have when deployed to Afghanistan.

"Our air tasking order technicians ensured Marine ground forces are familiar with the complex computer systems that will help them to properly request Air Force airborne intelligence, surveillance, and reconnaissance (ISR) assets," said Air Force Lt. Col. Denny Lewis, 505th Operations Squadron, JIT. "This capability will also enable the Marines to monitor the real-time execution of these assets in support of their ground mission."

The Air Force unit's headquarters, the 505th Command and Control Wing at Hurlburt Field, Fla., provides a multitude of joint and coalition command and control training opportunities. This training helps Marines and soldiers understand how to request and use airpower in real-world situations.

The JIT also provided remotely piloted aircraft (RPA) mission intelligence coordinators (MIC) to help train the RCT-8 staff on important TTP for employing RPAs like the MQ-1 Predator and MQ-9 Reaper.

"Our goal is to ensure the regimental staff understands the capabilities and limitations of assets like the Predator and Reaper that will be at their disposal while they're in Afghanistan," said Lisa Jalbert, RPA MIC, 505th Operations Squadron, JIT. "These important assets will provide the overwatch and extra set of eyes for the ground commander while they conduct their combat mission."

Part of JFIIT's mission during this exercise was to enhance the RCT-8 staff's ability to employ and integrate joint fires assets similar to what they will have in theater.

"Our primary purpose was to help MCTOG provide a joint experience for the training audience that replicates current theater operations and improve the unit's ability to leverage its joint fires capabilities," said Craig "Raz" Berryman, JFIIT senior analyst. "This was the deploying unit's best opportunity to receive this type of mission-essential training before they're in combat."

According to exercise participants, MCTOG's using TBMCS provided them with an important opportunity to learn how to leverage a system that's available to units in Afghanistan.

"The ability to train with systems like TBMCS is an important part of what we need before we deploy," said Army Lt. Col. Dean Hagadorn, II Marine Expeditionary Force (Forward), air future operations planner. "This is the system we will be using in theater to get our aviation requirements on the air tasking order and we can't afford to wait until we're deployed to figure it out."

"This has been excellent training and allowed all of us, regardless of the uniform we're wearing, to work with this system and learn how we can use it properly so we can more effectively accomplish our mission," said Marine Corps Maj Mike Swingler, 2nd Marine Logistics Group, air officer. "It's a critical part of the foundation we need before we deploy."

The importance of this exercise to the deploying unit was very clear.

"Spartan Resolve allowed us to hone our staff processes with important joint partners and other enablers to ensure we're prepared to provide coherent and comprehensive command and control throughout our battle-space," said Marine Corps Maj James Ryans, RCT-8, operations officer. "We will be better prepared for our deployment and be able to maximize the use of all the available assets in theater because of this training."

According to Szepesy, MCTOG will continue providing a realistic training environment that is based on current doctrine, TTPs, and best practices employed in theater by working together with organizations like JFIIT, the 505th Operations Squadron, and others.

"Spartan Resolve and our exercise partners provide an incredible resource to our training audience that better prepares our battalion and regimental staffs for the challenges of combat," Szepesy added. "Together, we provide the creative solutions necessary to defeat this irregular warfare threat.

"These important assets will provide the overwatch and extra set of eyes for the ground commander while they conduct their combat mission."

CURRENT ALSA MTTP PUBLICATIONS

AIR BRANCH – POC alsaa@langley.af.mil

TITLE	DATE	PUB #	DESCRIPTION / STATUS
AOMSW *Multi-Service Tactics, Techniques, and Procedures for Air Operations in Maritime Surface Warfare* **Distribution Restricted**	17 NOV 08	NTTP 3-20.8 AFTTP 3-2.74	Description: This publication consolidates Service doctrine, TTP, and lessons-learned from current operations and exercises to maximize the effectiveness of "air attacks on enemy surface vessels". Status: **Current**
AVIATION URBAN OPERATIONS *Multi-Service Tactics, Techniques, and Procedures for Aviation Urban Operations* **Distribution Restricted**	9 JUL 05	FM 3-06.1 MCRP 3-35.3A NTTP 3-01.04 AFTTP 3-2.29	Description: Provides MTTP for tactical-level planning and execution of fixed- and rotary-wing aviation urban operations. Status: **Revision**
IADS *Multi-Service Tactics, Techniques, and Procedures for an Integrated Air Defense System* **Distribution Restricted**	1 MAY 09	FM 3-01.15 MCRP 3-25E NTTP 3-01.8 AFTTP 3-2.31	Description: Provides joint planners with a consolidated reference on Service air defense systems, processes, and structures to include integration procedures. Status: **Current**
JFIRE *Multi-Service Procedures for the Joint Application of Firepower* **Distribution Restricted**	20 DEC 07	FM 3-09.32 MCRP 3-16.6A NTTP 3-09.2 AFTTP 3-2.6	Description: Pocket size guide of procedures for calls for fire, CAS, and naval gunfire. Provides tactics for joint operations between attack helicopters and fixed-wing aircraft performing integrated battlefield operations. Status: **Revision**
JSEAD / ARM-J *Multi-Service Tactics, Techniques, and Procedures for the Suppression of Enemy Air Defenses in a Joint Environment* **Classified SECRET**	28 MAY 04	FM 3-01.4 MCRP 3-22.2A NTTP 3-01.42 AFTTP 3-2.28	Description: Contributes to Service interoperability by providing the JTF and subordinate commanders, their staffs, and SEAD operators a single, consolidated reference. Status: **Assessment**
JSTARS (ATCARS) *Multi-Service Tactics, Techniques, and Procedures for the Joint Surveillance Target Attack Radar System* **Distribution Restricted**	16 NOV 06	FM 3-55.6 MCRP 2-24A NTTP 3-55.13 AFTTP 3-2.2	Description: Provides procedures for the employment of JSTARS in dedicated support to the JFC. Describes multi-Service TTP for consideration and use during planning and employment of JSTARS. Status: **Revision**
KILL BOX *Multi-Service Tactics, Techniques, and Procedures for Kill Box Employment* **Distribution Restricted**	4 AUG 09	FM 3-09.34 MCRP 3-25H NTTP 3-09.2.1 AFTTP 3-2.59	Description: Assists the Services and JFCs in developing, establishing, and executing Kill Box procedures to allow rapid target engagement. Describes timely, effective multi-Service solutions to FSCMs, ACMs, and maneuver control measures with respect to Kill Box operations. Status: **Current**
SCAR *Multi-Service Tactics, Techniques, and Procedures for Strike Coordination and Reconnaissance* **Distribution Restricted**	26 NOV 08	FM 3-60.2 MCRP 3-23C NTTP 3-03.4.3 AFTTP 3-2.72	Description: This publication provides strike coordination and reconnaissance (SCAR) MTTP to the military Services for the conduct of air interdiction against targets of opportunity. Status: **Current**
SURVIVAL, EVASION, AND RECOVERY *Multi-Service Tactics, Techniques, and Procedures for Survival, Evasion, and Recovery* **Distribution Restricted**	20 MAR 07	FM 3-50.3 NTTP 3-50.3 AFTTP 3-2.26	Description: Provides a weather-proof, pocket-sized, quick reference guide of basic survival information to assist Service members in a survival situation regardless of geographic location. Status: **Revision**
TAGS *Multi-Service Tactics, Techniques, and Procedures for the Theater Air-Ground System* **Distribution Restricted/ REL ABCA**	10 APR 07	FM 3-52.2 NTTP 3-56.2 AFTTP 3-2.17	Description: Promotes Service awareness regarding the role of airpower in support of the JFC's campaign plan, increases understanding of the air-ground system, and provides planning considerations for the conduct of air-ground ops. Status: **Current**
TST (DYNAMIC TARGETING) *Multi-Service Tactics, Techniques, and Procedures for Targeting Time-Sensitive Targets* **Distribution Restricted**	1 MAR 11	FM 3-60.1 MCRP 3-16D NTTP 3-60.1 AFTTP 3-2.3	Description: Provides the JFC, the operational staff, and components MTTP to coordinate, de-conflict, synchronize, and prosecute TSTs within any AOR. Includes lessons learned, multinational and other government agency considerations. Status: **Signature Draft**

AIR BRANCH – POC alsaa@langley.af.mil

TITLE	DATE	PUB #	DESCRIPTION / STATUS
UAS *Multi-Service Tactics, Techniques, and Procedures for Tactical Employment of Unmanned Aircraft Systems* **Distribution Restricted**	1 MAR 11	FM 3-04.15 NTTP 3-55.14 AFTTP 3-2.64	Description: Establishes MTTP for UAS addressing tactical and operational considerations, system capabilities, payloads, mission planning, logistics, and most importantly, multi-Service execution. Status: **Signature Draft**

LAND AND SEA BRANCH – POC alsab@langley.af.mil

TITLE	DATE	PUB #	DESCRIPTION / STATUS
ADVISING *Multi-Service Tactics, Techniques, and Procedures for Advising Foreign Forces* **Distribution Restricted**	10 SEP 09	FM 3-07.10 MCRP 3-33.8A NTTP 3-07.5 AFTTP 3-2.76	Description: This publication serves as a reference to ensure coordinated multi-Service operations for planners and operators preparing for, and conducting, advisor team missions. It is intended to provide units and personnel scheduled to advise foreign forces with viable TTP so they can successfully plan, train for, and carry out their mission. Status: **Current**
AIRFIELD OPENING *Multi-Service Tactics, Techniques, and Procedures for Airfield Opening* **Distribution Restricted**	15 MAY 07	FM 3-17.2 NTTP 3-02.18 AFTTP 3-2.68	Description: A quick-reference guide to opening an airfield in accordance with MTTP. Contains planning considerations, airfield layout, and logistical requirements for opening an airfield. Status: **Assessment**
CFSOF *Multi-Service Tactics, Techniques, and Procedures for Conventional Forces and Special Operations Forces Integration and Interoperability* **Distribution Restricted**	17 MAR 10	FM 6-03.05 MCWP 3-36.1 NTTP 3-05.19 AFTTP 3-2.73 USSOCOM Pub 3-33V.3	Description: This publication assists in planning and executing operations where conventional forces and special operations forces (CF/SOF) occupy the same operational environment. Status: **Current**
CORDON AND SEARCH *Multi-Service Tactics, Techniques, and Procedures for Cordon and Search Operations* **Distribution Restricted**	25 APR 06	FM 3-06.20 MCRP 3-31.4B NTTP 3-05.8 AFTTP 3-2.62	Description: Consolidates the Services' best TTP used in cordon and search operations. Provides MTTP for the planning and execution of cordon and search operations at the tactical level of war. Status: **Revision**
EOD *Multi-Service Tactics, Techniques, and Procedures for Explosive Ordnance Disposal in a Joint Environment* **Approved for Public Release**	27 OCT 05	FM 4-30.16 MCRP 3-17.2C NTTP 3-02.5 AFTTP 3-2.32	Description: Provides guidance and procedures for the employment of a joint EOD force. It assists commanders and planners in understanding the EOD capabilities of each Service. Status: **Revision**
Military Diving Operations (MDO) *Multi-Service Tactics, Techniques, and Procedures for Military Diving Operations* **Approved for Public Release**	12 Jan 11	ATTP 3-34.84 MCRP 3-35.9A NTTP 3-07.7 AFTTP 3-2.80 CG COMDTINST 3-07.7	Description: This MTTP publication describes US Military dive mission areas (DMA) as well as the force structure, equipment, and primary missions that each Service could provide to a JTF Commander. Status**:** **Current**
MILITARY DECEPTION *Multi-Service Tactics, Techniques, and Procedures for Military Deception* **Classified SECRET**	12 APR 07	MCRP 3-40.4A NTTP 3-58.1 AFTTP 3-2.66	Description: Facilitate the integration, synchronization, planning, and execution of MILDEC operations. Servce as a "one stop" reference for service MILDEC planners to plan and execute multi-service MILDEC operations. Status: **Assessment**
NLW *Multi-Service Tactics, Techniques, and Procedures for the Tactical Employment of Nonlethal Weapons* **Approved for Public Release**	24 OCT 07	FM 3-22.40 MCWP 3-15.8 NTTP 3-07.3.2 AFTTP 3-2.45	Description: This publication provides a single-source, consolidated reference on the tactical employment of NLWs and offers commanders and their staff guidance for NLW employment and planning. Commanders and staffs can use this publication to aid in the tactical employment of NLW during exercises and contingencies. Status**:** **Revision**
PEACE OPS *Multi-Service Tactics, Techniques, and Procedures for Conducting Peace Operations* **Approved for Public Release**	20 OCT 03 Change 1 incorporated 14 APR 09	FM 3-07.31 MCWP 3-33.8 AFTTP 3-2.40	Description: Provides tactical-level guidance to the warfighter for conducting peace operations. Status: **Current with Change 1**
TACTICAL CONVOY OPERATIONS *Multi-Service Tactics, Techniques, and Procedures for Tactical Convoy Operations* **Distribution Restricted**	13 JAN 09	FM 4-01.45 MCRP 4-11.3H NTTP 4-01.3 AFTTP 3-2.58	Description: Consolidates the Services' best TTP used in convoy operations into a single multi-Service TTP. Provides a quick reference guide for convoy commanders and subordinates on how to plan, train, and conduct tactical convoy operations in the contemporary operating environment. Status: **Current**

LAND AND SEA BRANCH – POC alsab@langley.af.mil

TITLE	DATE	PUB #	DESCRIPTION / STATUS
TECHINT *Multi-Service Tactics, Techniques, and Procedures for Technical Intelligence Operations* **Approved for Public Release**	9 JUN 06	FM 2-22.401 NTTP 2-01.4 AFTTP 3-2.63	Description: Provides a common set of MTTP for technical intelligence operations. Serves as a reference for Service technical intelligence planners and operators. Status: **Current**
UXO *Multi-Service Tactics, Techniques, and Procedures for Unexploded Explosive Ordnance Operations* **Approved for Public Release**	1 MAR 11	FM 3-100.38 MCRP 3-17.2B NTTP 3-02.4.1 AFTTP 3-2.12	Description: Describes hazards of UXO submunitions to land operations, addresses UXO planning considerations, and describes the architecture for reporting and tracking UXO during combat and post conflict. Status: **Signature Draft**

COMMAND AND CONTROL (C2) BRANCH - POC: alsac2@langley.af.mil

TITLE	DATE	PUB #	DESCRIPTION / STATUS
AIRSPACE CONTROL *Multi-Service Tactics, Techniques, and Procedures for Airspace Control* **Distribution Restricted**	22 MAY 09	FM 3-52.1 AFTTP 3-2.78	Description: This MTTP publication is a tactical level document, which will synchronize and integrate airspace command and control functions and serve as a single source reference for planners and commanders at all levels Status: **Current**
BREVITY *Multi-Service Brevity Codes* **Distribution Restricted**	7 APR 10	FM 1-02.1 MCRP 3-25B NTTP 6-02.1 AFTTP 3-2.5	Description: Defines multi-Service brevity which standardizes air-to-air, air-to-surface, surface-to-air, and surface-to-surface brevity code words in multi-Service operations. Status: **Current**
CIVIL SUPPORT (DSCA) *Multi-Service Tactics, Techniques, and Procedures for Civil Support Operations* **Distribution Restricted**	3 DEC 07	FM 3-28.1 NTTP 3-57.2 AFTTP 3-2.67	Description: Fills the Civil Support Operations MTTP void and assists JTF commanders in organizing and employing Multi-Service Task Force support to civil authorities in response to domestic crisis. Status: **Revision**
COMCAM *Multi-Service Tactics, Techniques, and Procedures for Joint Combat Camera Operations* **Approved for Public Release**	24 MAY 07	FM 3-55.12 MCRP 3-33.7A NTTP 3-13.12 AFTTP 3-2.41	Description: Fills the void that exists regarding combat camera doctrine and assists JTF commanders in structuring and employing combat camera assets as an effective operational planning tool. Status: **Revision**
HAVE QUICK *Multi-Service Tactics, Techniques, and Procedures for HAVE QUICK Radios* **Distribution Restricted**	7 MAY 04	FM 6-02.771 MCRP 3-40.3F NTTP 6-02.7 AFTTP 3-2.49	Description: Simplifies planning and coordination of HAVE QUICK radio procedures. Provides operators information on multi-Service HAVE QUICK communication systems while conducting home station training or in preparation for interoperability training. Status: **Assessment**
HF-ALE *Multi-Service Tactics, Techniques, and Procedures for the High Frequency-Automatic Link Establishment (HF-ALE) Radios* **Distribution Restricted**	20 NOV 07	FM 6-02.74 MCRP 3-40.3E NTTP 6-02.6 AFTTP 3-2.48	Description: Standardizes high power and low power HF-ALE operations across the Services and enables joint forces to use HF radio as a supplement / alternative to overburdened SATCOM systems for over-the-horizon communications. Status: **Assessment**
JATC *Multi-Service Tactics, Techniques, and Procedures for Joint Air Traffic Control* **Distribution Restricted**	23 JUL 09	FM 3-52.3 MCRP 3-25A NTTP 3-56.3 AFTTP 3-2.23	Description: Provides guidance on ATC responsibilities, procedures, and employment in a joint environment. Discusses JATC employment and Service relationships for initial, transition, and sustained ATC operations across the spectrum of joint operations within the theater or AOR. Status: **Current**
EW REPROGRAMMING *Multi-Service Tactics, Techniques, and Procedures for the Reprogramming of Electronic Warfare and Target Sensing Systems* **Distribution Restricted**	01 FEB 11	ATTP 3-13.10 MCRP 3-40.5A NTTP 3-51.2 AFTTP 3-2.7	Description: Supports the JTF staff in planning, coordinating, and executing reprogramming of electronic warfare and target sensing systems as part of joint force command and control warfare operations. Status: **Current**
TACTICAL CHAT *Multi-Service Tactics, Techniques, and Procedures for Internet Tactical Chat in Support of Operations* **Distribution Restricted**	7 JUL 09	FM 6-02.73 MCRP 3-40.2B NTTP 6-02.8 AFTTP 3-2.77	Description: This publication provides MTTP to standardize and describe the use of internet tactical chat (TC) in support of operations. It provides commanders and their units with guidelines to facilitate coordination and integration of TC when conducting multi-Service and joint force operations. Status: **Current**

COMMAND AND CONTROL (C2) BRANCH - POC: alsac2@langley.af.mil			
TITLE	**DATE**	**PUB #**	**DESCRIPTION / STATUS**
TACTICAL RADIOS *Multi-Service Communications Procedures for Tactical Radios in a Joint Environment* **Approved for Public Release**	14 JUN 02	FM 6-02.72 MCRP 3-40.3A NTTP 6-02.2 AFTTP 3-2.18	Description: Standardizes joint operational procedures for SINCGARS and provides an overview of the multi-Service applications of EPLRS. Status: **Assessment**
UHF TACSAT/DAMA *Multi- Service Tactics, Techniques, and Procedures Package for Ultra High Frequency Tactical Satellite and Demand Assigned Multiple Access Operations* **Approved for Public Release**	31 AUG 04	FM 6-02.90 MCRP 3-40.3G NTTP 6-02.9 AFTTP 3-2.53	Description: Documents TTP that will improve efficiency at the planner and user levels. (Recent operations at JTF level have demonstrated difficulties in managing limited number of UHF TACSAT frequencies.) Status: **Revision**

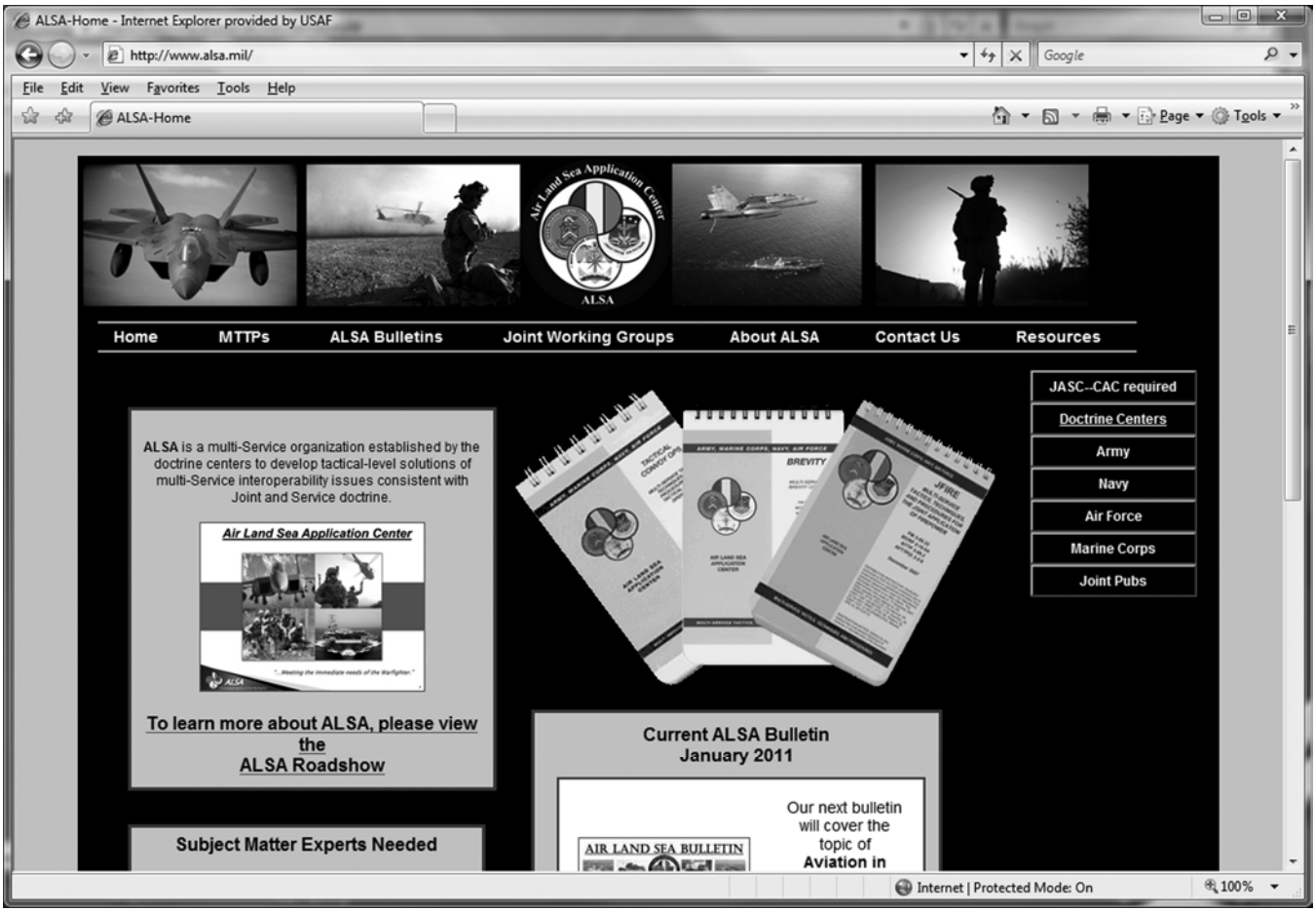
ACCESS TO ALSA PRODUCTS

Unclassified: http://www.alsa.mil

CAC Login: https://wwwmil.alsa.mil

SIPR: http://www.acc.af.smil.mil/alsa

JDEIS: https://jdeis.js.mil/jdeis/index.jsp?pindex=84



ALSA ORGANIZATION

JASC
Joint Actions Steering Committee

Director
Col David B. Hume, USAF

Deputy
COL Bruce Sones, USA

NCOIC
TSgt Christal Jefferson, USAF

Support Staff
Cheryl Parris, Admin Support Asst
Sonya Robinson, Budget Analyst
Leila Joyce, Office Auto Asst

Publishing Staff
Beatrice Waggener, Editor
Laura Caswell, Illustrator
CDR (S) Cindy Dieterly, Publications Officer

Air
LTC Stephen Parker, USA
Lt Col (S) Ray Zuniga, USAF
MAJ Brian Bolio, USA
Maj Jeffrey Hughes, USMC
USAF, Vacant

Land and Sea
LTC Reginald Armstrong, USA
LTC Troy Ewing, USA
Maj William Wallis, USAF
MAJ Michael Saxon, USA
USAF, Vacant

Command and Control
Lt Col Michael Woltman, USAF
Lt Col Andrew Frasch, USAF
CDR (S) Cindy Dieterly, USN
LTC Deidra Broderick, USA

Air Operations in Maritime Surface Warfare (AOMSW)
17 Nov 08

Aviation Urban Operations
9 Jul 05

Dynamic Targeting (DT)
1 Mar 11

Integrated Air Defense System (IADS)
1 May 09

Joint Application of Firepower (JFIRE)
20 Dec 07

Joint Surveillance Target Attack Radar System (JSTARS)
16 Nov 06

Kill Box Employment
4 Aug 09

Strike Coordination and Reconnaissance (SCAR)
26 Nov 08

Suppression of Enemy Air Defenses (JSEAD)
28 May 04

Survival, Evasion, and Recovery
20 Mar 07

Tactical Employment of Unmanned Aircraft Systems (UAS)
1 Mar 11

Theater Air-Ground System (TAGS)
10 Apr 07

Advising Foreign Forces
10 Sep 09

Airfield Opening
15 May 07

Conducting Peace Operations (PEACE OPS)
14 Apr 09 (CH1)

Conventional Forces / Special Operations Forces Integration and Interoperability (CFSOF)
17 Mar 10

Cordon and Search Operations
25 Apr 06

Explosive Ordnance Disposal (EOD)
27 Oct 05

Military Deception (MILDEC)
12 Apr 07

Military Diving Operations (MDO)
12 Jan 11

Nonlethal Weapons (NLW)
24 Oct 07

Tactical Convoy Operations (TCO)
13 Jan 09

Technical Intelligence (TECHINT)
9 Jun 06

Unexploded Explosive Ordnance Operations (UXO)
1 Mar 11

Airspace Control
22 May 09

Brevity Codes
Apr 10

Civil Support Operations
3 Dec 07

Combat Camera Operations (COMCAM)
24 May 07

Have Quick Radios
7 May 04

High Frequency-Automatic Link Establishment Radios (HF-ALE)
20 Nov 07

Joint Air Traffic Control (JATC)
23 Jul 09

Electronic Warfare Reprogramming
1 Feb 11

Internet Tactical Chat in Support of Operations (Tactical Chat)
7 Jul 09

Tactical Radios
14 Jun 02

Ultra High Frequency Tactical Satellite and Demand Assigned Multiple Access Operations (UHF TACSAT/DAMA)
31 Aug 04

ALSA's mission is to rapidly and responsively develop multi-Service tactics, techniques and procedures (MTTP), studies, and other like solutions across the entire military spectrum to meet the immediate needs of the warfighter.

ALSA is a joint organization chartered by a memorandum of agreement under the authority of the Commanders, Army Training and Doctrine Command (TRADOC), USMC Combat Development Command (MCCDC), Navy Warfare Development Command (NWDC), and Headquarters, Curtis E. LeMay Center for Doctrine Development and Education. ALSA is governed by a Joint Actions Steering Committee (JASC) consisting of four voting and three nonvoting members.

Voting JASC Members

RADM Wendi B. Carpenter

Commander, Navy Warfare Development Command

Maj Gen David S. Fadok

Commander, Curtis E. LeMay Center for Doctrine Development and Education

Mr. Dale A. Ormond

Deputy to the Commanding General US Army Combined Arms Center

BGen Daniel J. O'Donohue

Director, Capabilities Development Directorate, Marine Corps Combat Development Command

Next Issue: "Open Warfighter Forum"

The mission of the Air Land Sea Application Center (ALSA) is to responsively develop multi-Service doctrine built on sound warfighting theory and practical experience, to guide US forces in coordinated action toward common objectives.

In addition, to developing doctrine, ALSA invariably desires to facilitate operationally relevant information exchanges between warfighters in the Air Land Sea Bulletin (ALSB). Historically, the ALSB converges on issues that span an entire range of military operations and provides empirical insight from contemporary warfighters. As such, we want to publish your observations and lessons learned in the September edition to provide a cross-Service flow of warfighting concepts.

The topic for the September ALSB is an "Open Forum on Warfighter Topics". Please be advised, this is an excellent opportunity for you to share your insights, regardless of specialty, and to enhance the professional development of all US warfighters.

*Note: Article submissions and photos are due by 1 July 2011 for publication in our September 2011 issue. Please send articles (in MS Word document format) and high-resolution 300 dpi minimum pictures in a separate file to:

Team B: Land & Sea Operations
alsab@langley.af.mil

ALSA CENTER
ATTN: ALSB
114 ANDREWS STREET
LANGLEY AFB VA 23665-2785

OFFICIAL BUSINESS

alsacenter@langley.af.mil

http://www.alsa.mil